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ABSTRACT

In an effort to shed light on the questions surrounding the use and impact of computer-based information systems, the Special Projects Division of the Minnesota Educational Computing Consortium undertook a field-based study of a computer-based information system that can process and produce information dealing with students, curriculum, personnel, facilities/equipment/supplies, and finances. The system is made available through Total Information for Educational Systems (TIES), a cooperative developed and operated by 50 school districts in Minnesota. Indepth interviews were held with 134 employees in eleven of the 50 districts. The employees perform a wide variety of functions categorized as dealing with strategic planning, management control, and operations control. The pervasiveness of the more observable and tangible benefits (timesavings, more accurate and timely data, the capability to schedule classes more flexibly, the capability to decentralize budgetary development and control, and easier reporting to external agencies) and the potential for realizing the more intangible benefits (better decision-making, better long-range planning, more effective resource management, more time to work with people, and better educated students) lead to the conclusion that the investment of time and money in a computer-based information system yields very worthwhile returns. (Author/IRT)

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EXECUTIVE SUMMARY

A STUDY OF THE AVAILABILITY, USE AND IMPACT OF COMPUTERS IN THE ADMINISTRATION OF SCHOOLS AND SCHOOL DISTRICTS

NOVEMBER 1977

Special Projects Division
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This is a summary of a study that was conducted by the Special Projects Division of the Minnesota Educational Computing Consortium under contract with the National Institute of Education, United States Department of Health, Education, and Welfare. The opinions expressed in this summary, and in the full report, do not necessarily reflect NIE position and policy, and no official endorsement by the National Institute of Education should be inferred.

Persons interested in purchasing a copy of the full report (180 pp.) of the study should contact Special Projects. The cost of the report is $5.75, plus $0.50 for mailing. The report will also be available through ERIC.

The authors of the report, and this summary, are Drs. Thomas Hansen and Daniel Klassen (MECC), and Dr. James Lindsay (TIES).

Background

The operation and management of schools are increasingly complex tasks. Given the problems and concerns spawned by rising costs and dwindling financial resources, educational decision-makers are constantly seeking ways to help them keep schools operating in a manner consistent with the goals and expectations set for them, and within the financial resources available.

In order to successfully manage educational institutions, personnel and programs, many school administrators have begun to employ computer technology and computer-based information systems. The purchase and development of computer-based information systems designed specifically for use in the administration of schools and districts, according to a recent nationwide study, is occurring with increasing frequency. In fact, given current growth rates, computers will be used by every school district in the country within the next decade.

The adoption and use of computer-based information systems is based on the expectation that these systems will produce favorable results: they will help save time and money, they will increase flexibility and responsiveness, they will produce more accurate, detailed and accessible data, and so forth. Unfortunately, few attempts have been made to identify the nature and scope of the use of computer-based information systems or to examine their impact on the operation of schools.

In an effort to shed light on the questions surrounding the use and impact of computer-based information systems, the Special Projects Division of the Minnesota Educational Computing Consortium with financial support from the National Institute of Education, undertook a field-based study that focused on a computer-based information system that can process and produce information dealing with students, curriculum, personnel, facilities/equipment/supplies, and finances. The system chosen for the study is made available through TIES (Total Information for Educational Systems), a cooperative developed and operated by fifty school districts in Minnesota. The TIES-member districts were selected for analysis because of their relatively long and stable history in using computer services, and because of the representativeness of the services offered. In-depth interviews were held with 134 school district employees in eleven of the fifty districts. Persons interviewed included superintendents, assistant superintendents, business managers, accountants, personnel managers, administrative assistants, directors of research and evaluation, principals, assistant principals, counselors, teachers, clerical and secretarial personnel, and each district's information system coordinator.

These district employees perform a wide variety of functions. These functions may be categorized as dealing primarily with strategic planning, management control, and operational control.[1] Strategic planning, as the name implies, includes long-range planning and policy-making. For example, decisions about future facilities would fit into this category. Management control involves the development, supervision, and evaluation of programs/activities that are designed to meet the purposes of the

policies and long-range plans. Examples would be the development and analysis of alternative employee salary schedules, or the evaluation of the teaching staff. Operational control refers to specific and often routine tasks such as the development of mailing lists and labels, and payroll processing.

This study investigates the ways in which the computer-based information system interacts with the various functions performed in a school district.

Findings and Conclusions

Availability

The computer-based information system used in the school districts studied includes an integrated collection of computer-based administrative applications (e.g., scheduling, mark reporting, financial forecasting). Most of the applications were specifically designed to perform operational control tasks. The availability of a rather large number of computer-based applications designed to perform operational control tasks is similar to most other educational, as well as non-educational organizations. Since computers can perform clerical and computational tasks very efficiently, and since the development of these applications is quite straightforward, it is not surprising that this type of application outnumbers applications designed to support management control and strategic planning. However, after several years of experience in using computer technology and computer-based information systems some users are beginning to reach a higher level of sophistication and they are actively seeking ways to enhance current applications and develop new applications that will facilitate and support strategic planning.

Since the districts studied share a common computer-based information system, the applications that are available, for the most part, reflect the desires and needs of the majority of the users. The cooperative nature of the service does, however, mean that the individual district must learn to use the available system even if it is not exactly what they want or need, given their unique problems and structure. If a district does not have an individual(s) assigned to facilitate the use of the applications who knows enough about them to be able to adapt them to the district's special conditions, the availability of the computer-based information system for that district remains primarily at the clerical/computational level. However, if the district's information system coordinator understands the complexities of the system file structure, can use higher level information linking capabilities of the system, can employ projection applications, and makes use of the research and technical consultation services, the availability of the system as an aid serving management control and strategic planning is expanded considerably. As a result, the actual availability of applications to the various users in a district is affected by both the collective decision of the cooperating districts as to what applications and services should be offered, and the ability of the individual(s) charged with delivering and supporting the specific applications within the local district. The actual availability (the degree to which the district can utilize the system in support of all three levels of operation) can be effectively and significantly increased if the district utilizes a person(s) who has a good working knowledge of computer technology and related information systems, and provides that person(s) with sufficient resources and authority within the district.

Since all of the cooperating districts pay for computer services based on the same payment schedule, cost is not a significant factor impacting the availability of the basic applications. All districts, in essence, have the same applications available to them. However, because most smaller districts as well as some larger ones are faced with financial constraints which influence their ability to employ a person with the expertise and time needed to adapt the system to district needs, cost does become a factor determining actual availability.

Use

As might be expected, considering the nature of what is available, the greatest use of the computer-based applications is at the operational control level; this involves, for example, the production of class lists, mailing labels, and attendance reports. Functions of this type tend to be performed on a regular and reoccurring basis, so the frequency of use of the applications designed to perform these tasks is quite high. Use of the computer-based information system decreases as one moves toward the strategic planning level of district operation.

There are several basic reasons offered for the less frequent use of the system at the management control and strategic planning levels. First, and this is particularly true at the strategic planning level, the major decisions made and the tasks performed are long-range and thus naturally occur with less frequency. Next, the tasks to be performed and the decisions to be made must incorporate many factors other than just computer-stored and summarized information. Since it is difficult, if not impossible, to know exactly how a decision-maker actually makes decisions or to determine what factors influence a

decision and to what extent, the importance of computer-produced information is difficult to determine. While numerous examples were cited by the decision-makers interviewed (for example, the importance of census data in reaching vital decisions as to future staffing needs), the relative weight given the information by the decision-maker remains unknown. Experience, judgment, and understanding of the situation are all factors which must be entered into the decision-making formula. Third, since many decisions made at the top management level are influenced by factors which are beyond the control of the school administrator, the important information for decision-making is generated by the environment external to the school. For example, a school district's future funding and facilities needs are directly influenced by population growth and migration trends. Except for enrollment and revenue projects, there is very little information within the computer-based information system that can be used to analyze external factors; to analyze community attitudes and trends, to make comparisons and contrasts with other organizations, or to examine the impact of changing legal and structural trends and requirements. Finally, it remains true that there are many long-range, strategic decisions made that are based on information concerning the district's internal operation and situation. Decision-makers want and need summary information, reports of exceptions to normal operation, and internal trend information. Currently, this type of information is usually developed and compiled manually at a lower operational level within the district, although some information system coordinators have produced such information through the use of the system enhancements that are available. Indications are that

such information is valuable to decision makers and that those who have received it are demanding an increased capability of the computer-based system to produce it more easily than can be done using current procedures. This type of demand seems to offer the greatest potential for the expanded use of the information system at the strategic and long-range planning level.

Impact

It is evident that the available computer-based applications are used to perform a wide variety of important tasks in the school districts. As a consequence, the impact of computer use is found throughout each district, although not to the same extent in every district. While some persons report a desire to change or enhance the current applications, few persons feel that the computer and the information system it supports are producing unfavorable, or negative impacts. On the contrary, most view the computer as a tool that is enabling them to perform many vital educational and administrative tasks; a tool that they would not want to do without. The computer, according to most users, allows them to perform many tasks and to accomplish many objectives that would not be attempted without the aid of a computer. Listed below, in summary form, are some of the major impacts identified during the study. Except for the instances noted in numbers 5 and 6, the impacts were perceived by those interviewed as being favorable.

1. For many people, a significant amount of time has been freed from clerical tasks. While for some, this "freed" time is absorbed by computer-related duties, for others the time is truly available to perform other tasks.

2. More accurate personnel, student, and financial records can be kept. Records can be accessed more easily and the stored data can be sorted in a multitude of ways, thus facilitating flexible reporting to school personnel and external agencies.
3. More accurate projections of student enrollments can be produced, thus greatly aiding in planning for facilities and personnel needs, and in communication with constituents.
4. Decentralization of budgetary development and control is made more feasible because personnel receive accurate, detailed, and relevant budget information. Many more line items can be included in the chart of accounts.
5. More frequent and flexible scheduling of classes can be performed. More electives, and more classes of varying lengths can be offered. In schools with less complicated traditional schedules, this benefit is not realized, and the impact of computer use in scheduling is perceived as unfavorable by a few persons.
6. In most schools, a longer period of time now elapses between the end of a term and the distribution of student progress reports. Some teachers and administrators view this as an unfavorable impact of computer use.
7. Districts can more easily conduct research studies of their activities, such as student follow-up studies that aid curricular decisions.
8. Significant cost savings can be realized through use of the computer to aid in developing bus routes. Although the computer program does not

automatically determine routes, the data stored and processed by the computer greatly aids the building of efficient routes and the performance of day-to-day transportation tasks.

As this summary list illustrates, significant favorable impacts were found to exist across a wide range of functions and tasks performed in the operation and management of school districts. In the districts which make the most extensive use of the computer-based information system nearly all of these impacts, and many other significant favorable impacts, were found to exist.

Most of the impacts mentioned by those interviewed are related to the operational and management control levels of district operation. At the strategic planning level the most significant impact seems to be that accurate, timely and comprehensive census (population) data are enabling administrators and school board members to better anticipate changes in enrollments. Since for many districts the decline in enrollment is the root of most of the major problems and concerns facing the district, good census data are very valuable to top decision-makers. Because financial aid is linked directly to enrollments, and because operating costs do not necessarily decrease in proportion to enrollment decline, it is paramount that declines be predicted early and accurately.

Computer-stored and produced budget information is also important to the top administrators as they seek ways to use scarce resources more efficiently. In districts that are not facing the problem of declining (or shifting) school age populations, the perceived need for accurate census data and related strategic planning information is less evident, and the impact of the computer in decision-making at the strategic level seems minimal.

Value of Computer Use

Two different levels of benefits related to computer use have emerged in this research study. First, there are those fairly observable and tangible impacts of computer use which, in the opinion of the people who were interviewed, are beneficial. For example: timesavings; more accurate and timely data; the capability to schedule classes more flexibly; the capability to decentralize budgetary development and control, and easier reporting to external agencies.

Computer use enables the district to realize these benefits. Most of these benefits would not be realized or, at least, would be more difficult to achieve if a computer were not used to process and produce information.

While the evidence generated by this study supports the conclusion that these types of benefits can be obtained, the question of their ultimate value remains. Is having the ability to obtain these benefits of any real or lasting value to a district?

Most interviewees suggested that there is another level of benefits that derive from and are related to the first. Better decision-making, better long-range planning, more effective resource management, more time to work with people, and better educated students are claims often heard. For instance, in districts that have a decentralized budgetary development and control process, the claim is made that by placing budget responsibility and authority with the persons who are closest to the student, the curriculum and the learning resources, more effective planning and management of resources will follow. The computer, it is argued, enables the district to provide personnel with the type of information that is necessary before they can be asked to be accountable to management

for their specific area of responsibility. It is not the purpose of this study to determine whether or not this redirection of accountability is of ultimate value to the district. It is fair to conclude, however, that the computer at least offers a district the potential to make changes of this type that are thought to be important.

While the computer-based information system is a valuable tool, one should not expect computer use to automatically produce an improvement in the quality of management in the district. In school districts where careful planning is recognized as being essential for effective management, the computer becomes a valuable part of that planning process, and better planning may result. However, computer availability and use does not of itself lead to careful planning, nor does it create the desire to engage in long-range planning. It is not a cure for poor management; but it can be of immense value to the person looking for ways to manage more effectively.

The computer is one intervening variable in the complex process of educating students. It is a tool that can help administrators, for example, to bring students and teachers together more efficiently so that learning may take place. However, no evidence was found that "better learning" results from district use of a computer to aid administrative functions.

Nevertheless, the pervasiveness of the more observable and tangible benefits, and the potential for realizing the more intangible benefits, lead us to conclude that the investment of time and money yields very worthwhile returns. In the few districts that have gone beyond use of the standard applications, and have used special enhancements to meet unique needs of management, the

value has been even greater. They have effectively expanded the basic computer-based information system into a computer-based management information system. The expanded system has increased value because it meets the information requirements of a broader spectrum of district personnel.

It is important that potential users of computer-based information systems understand what such systems can and cannot do for their districts. If they "buy into" such systems solely because they expect to reap the more intangible benefits, they may have difficulty in the future justifying the investment. However, if they attempt to justify the investment on the basis of the more tangible and observable benefits that are to be expected, evidence to support the wisdom of the investment should be readily apparent to both users and observers.

Notes

[1]Anthony, Robert N. Planning and Control Systems: A Framework for Analysis. Boston: Harvard University Press, 1965; Hentschke, Guilbert C. Management Operations in Education. Berkeley, California: McCutchan Publishing Corporation, 1975, pp. 433-442.